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## THE RESTORATION OF THE COFFEE PLANTATION.

By T. B. McClelland.

The coffee plantations, which but a few weeks ago gave promise of abundant labor to the coffee picker and ready money to both laborer and owner, today, for the most part, present a tragic picture. Dwelling houses and warehouses are smashed. Shade trees are uprooted or are twisted and torn and broken, or, blasted by the wind, stand dead. In some plantations the killing of the shade trees is so great that one might easily imagine himself in a northern forest in midwinter as he sees on every side the heavy trunks of the shade trees lifting their gaunt limbs and leafless branches skyward. The larger orange trees lie on their side with roots in air. The denuded coffee trees, recently loaded with fruit, stand with fruiting branches dead and only a meager development of new leaves at the tips of the upright branches. Such is the picture presented by many plantations. Others less severely swept by the wind have suffered in lesser degree, while favored situations are to be found where the damage to the coffee trees themselves is comparatively slight. Unfortunately, however, the destruction is widespread.

The planter who, though discouraged, has already shown by beginning reconstruction that his spirit is not broken is a man to be admired. He is at work upon his buildings, clearing away debris, and making charcoal of his fallen shade trees. His altered economic status necessitates cautious movement, and the extent to which he can carry his program of reconstruction depends largely on the extent to which he can secure the requisite cash or credit for the payment of the labor.

After his houses are made habitable, the most pressing problem is the securing of food for the laborers on the plantation. Where the usual employment of labor is to be reduced, land should be supplied and the laborer urged to plant the usual food crops in increased amount in order to sustain himself. Sweet potatoes, corn, beans, cowpeas, pigeon peas, yautias, malangas, yams, tomatoes, lettuce, squash, and so forth should be planted extensively as soon as conditions permit.

After the most immediately needed work is accomplished, the laborers sheltered and gardens started for supplying food, the rehabilitation of the plantation must be begun. Where the economic condition of the planter is such that he is able to work over only a fraction of the land formerly under cultivation, the sections containing the coffee promising the quickest return to production should be those to receive attention first. The initial step is to remove the dead and dying shade trees. Leaving them until later will but cause further destruction to the coffee after it has begun to recuperate. The dead shade trees should be felled and the broken limbs cut from the live shade trees while there is little below them to be injured. Plantings must be made of bananas to furnish temporary shade where needed and of young leguminous trees to supply a more permanent shade later on. Where the storm hit with greatest force both young and old shade trees were killed. Where the wind was less violent the plantations under large shade trees suffered







greater damage to both shade and coffee than where the coffee was shaded by younger or smaller trees. As the large shade trees crashed they carried destruction to the coffee below them. The younger, lower shade trees where broken did less damage to the coffee and will also redevelop much more rapidly. While the recurrence of a storm like that of September may not take place for many years, we know that in the past such storms have occurred from time to time and that in the future they may be expected. It behooves us to avoid providing the storm with whips with which to lash us. Such a whip is the tall shade tree in the coffee plantation.

There are two dwarf leguminous trees which the Station for some time has advocated planting as shade for coffee, Gliricidia sepium and Erythrina Berteroana.

The former is an imported tree very sparingly found in Porto Rico. It is readily propagated from seeds or cuttings and makes a rapid growth attaining a height of 20 to 30 feet. Its dwarf size and the hardness of the wood favor wind resistance. An extensive planting of Gliricidias at the Station today shows little damage, while large guavas, Inga edulis, nearby were totally destroyed. The roots of Gliricidia are crowded with the nodules formed by the nitrogen-gathering bacteria. At the season for the coffee to blossom the Gliricidias are bare of foliage, letting in wind and sunlight to aid in the movement of pollen. Though it cannot be considered the perfect coffee shade tree since it is a host for the thread blight, Corticium koleroga, which in some localities causes considerable injury to coffee, its many good qualities commend it for trial. The Station will have seed of this tree for free distribution in May. Coffee planters who are interested should send their requests for seed to the Station prior to that time.

The Erythrina Berteroana, locally termed "bucare enano"§ and elsewhere "machete", from the form of the flower, came through the storm in remarkably good condition as shown by solid plantings of this at the Mayaguez Station and at the Hacienda Semil near Villalba, and scattered trees in the wind-swept coffee region to the east of Mayaguez. A block of this planted at the Station as coffee shade sustained comparatively slight damage, whereas on either side of it under similar exposure guavas, Inga inga, were badly smashed. At the Hacienda Semil, Villalba, the storm damage was very great. The plantation, largely shaded by guavas, Inga inga, is today denuded of shade, the trees standing stark and dead. In the midst of this desolation and ruin, here and there are to be found solid blocks of bucares planted to carry vanilla. Though they were swept clean of leaves by the wind, they stand out today against the hillsides like green lettuce beds in a brown garden. Trees which were set 8 or 9 years ago spaced 6 x 9 feet, when seen 7 weeks after the storm furnished shade ample and excellent for the immediate planting of coffee. From the appearance of these trees today one would not know that they had passed through a hurricane. Had the devastated coffee region been planted to this tree, the rehabilitation of the coffee plantations would be a

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§ This should not be confused with the tall bucare, Erythrina Poeppigiana, a wholly different tree.







far simpler matter than it is. Though the wood is not hard, the low compact form of the tree renders it less liable to wind damage than in the case of a more spreading open tree. It is possible and even quite probable that the articulation at the base of the petiole facilitates the rapid loss of the leaves in a heavy blow since the leaves snap off at a light pressure properly directed, and in this way the limbs having jettisoned their cargo were able to ride out the recent storm. Like the species previously discussed, the generally rapid growth assures quick replacement of limbs lost through breakage. Unfortunately, in some sections a bud maggot continually destroys new growth. Where this is very prevalent growth is slow. Such is the case at the Hacienda Semil and while eight-year-old trees set 6 x 9 feet now furnish ample shade, four-year-old trees equally spaced do not. This tree has been used locally for fencing purposes and is to be found principally along the highways. Where so used it has been frequently lopped back and its growth kept lower than where free development is allowed. The planters have regarded it as a hodgrowing tree and have given little consideration to its possibilities for shading coffee. In common with the *Gliricidia*, it drops its leaves in the dry season, strikes root readily from cuttings, and eventually attains a height of 20 to 30 feet. On account of the small size, both species should be closely spaced. As the growth warrants, alternate trees may be removed and the shading readily maintained at the desired density.

The coffee trees require individual attention. Some need nothing done to them. Others need damaged parts removed. Broken limbs should be cut off obliquely close to the remaining trunk so that the water will drain rapidly rather than penetrate and rot the tree. Where the lateral branches have been stripped from the uprights by falling limbs, or have been killed by the wind, as is the case in many instances, it is preferable to cut the tree to a low stump, six or eight inches above the ground. Where the laterals are lost or dead, the production of a crop in the coming year is out of the question, and new growth arising from near the base will make a tree of much better form than if the new growth develops from the tips of the stripped uprights. The vigor of the new growth will be governed by the strength and condition of the root system. From vigorous roots vigorous growth may be expected, and similarly weak growth may be expected from root systems in poor condition. The growth from stumps may be expected to produce nothing in the coming season, only an insignificant number of cherries in the season following, a small crop at three years, and a fair crop at four years. Both more rapid development and earlier fruiting are to be expected from renewals from strong roots than from seed planted at the time the older tree is cut back.

Where no attempt is to be made to permanently restore the old coffee tree, it should be left uncut to produce such crops as it may, and in this way a somewhat larger production should be had in the next several years than were the tree cut back to a low stump.

The need for new coffee plantings is now far greater than it has been for many years. Those planters who establish seed beds now, while seed is yet available, will be a year ahead of those who wait for the next crop. As this station has previously pointed out, in selecting a site for a seed bed, a location should be chosen in which coffee has not been grown formerly, as root disease may be present in old coffee land.

The station has coffee seed for free distribution in limited amounts and this will be given to planters on request as long as the supply lasts.



